6217 (G) GUIDANCE MANAGEMENT MEASURES NOAA/EPA APPROVAL STATUS

MANAGEMENT MEASURES APPROVAL STATUS			
CHAPTER 1: AGRICULTURAL SOURCES	**1998 APPROVED**	**APPROVAL DATE**	**YET TO BE APPROVED**
A. Erosion and Sediment Control Management Measure 1. Apply the erosion component of a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the U.S. Department of Agriculture - Soil Conservation Service (see Appendix 2A of this chapter) to minimize the delivery of sediment from agricultural lands to surface waters, or 2. Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a 10-year, 24-hour frequency.			
B1. Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Large Units) 1. Limit the discharge from the confined animal facility to surface waters by storing both the facility wastewater and the runoff from confined animal facilities that is caused by storms up to and including a 25-year, 24-hour frequency storm. 2. Storage structures should: Have an earthen lining or plastic membrane lining, or Be constructed with concrete, or Be a storage tank; and 3. Managing stored runoff and accumulated solids from the facility through an appropriate waste utilization system.			
B2. Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Small Units) 1. Design and implement systems that collect solids, reduce contaminant concentrations, and reduce runoff to minimize the discharge of contaminants in both facility wastewater and in runoff that is caused by storms up to and including a 25-year, 24-hour frequency storm. Implement these systems to substantially reduce significant increases in pollutant loadings to ground water. 2. Manage stored runoff and accumulated solids from the facility through an appropriate waste utilization system.			

MANAGEMENT MEASURES APPROVAL STATUS			
I. AGRICULTURAL SOURCES (Cont.)	**1998 APPROVED**	**APPROVAL DATE**	**YET TO BE APPROVED**
C. Nutrient Management Measure 1. Develop, implement, and periodically update a nutrient management plan to: (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency. 2. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. 3. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely.			
D. Pesticide Management <u>To reduce contamination of surface water and ground water from pesticides:</u> 1. Evaluate the pest problems, previous pest control measures, and cropping history; 2. Evaluate the soil and physical characteristics of the site including mixing, loading, and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found to occur, steps should be taken to prevent further contamination; 3. Use integrated pest management (IPM) strategies that: a. Apply pesticides only when an economic benefit to the producer will be achieved (i.e., applications based on economic thresholds); and b. b. Apply pesticides efficiently and at times when runoff losses are unlikely; c. c. When pesticide applications are necessary and a choice of registered materials exists, consider the persistence, toxicity, runoff potential, and leaching potential of products in making a selection; 4. Periodically calibrate pesticide spray equipment; and 5. Use anti-backflow devices on hoses used for filling tank mixtures.			
E. Grazing Management <u>Protect range, pasture and other grazing lands:</u>			

1. By implementing one or more of the following to protect sensitive areas (such as streambanks, wetlands, estuaries, ponds, lake shores, and riparian zones): 2. Exclude livestock, 3. Provide stream crossings or hardened watering access for drinking, 4. Provide alternative drinking water locations, 5. Locate salt and additional shade, if needed, away from sensitive areas, or 6. Use improved grazing management (e.g., herding) 7. To reduce the physical disturbance and reduce direct loading of animal waste and sediment caused by livestock; and by achieving either of the following on all range, pasture, and other grazing lands not addressed under (1): 8. Implement the range and pasture components of a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the USDA-SCS (see Appendix 2A of this chapter) by applying the progressive planning approach of the USDA-Soil Conservation Service (SCS) to reduce erosion, or 9. Maintain range, pasture, and other grazing lands in accordance with activity plans established by either the Bureau of Land Management of the U.S. Department of the Interior or the Forest Service of USDA.			
F. Irrigation Water Management <u>To reduce nonpoint source pollution of surface waters caused by irrigation:</u> 1. Operate the irrigation system so that the timing and amount of irrigation water applied match crop water needs. This will require, as a minimum: (a) the accurate measurement of soil-water depletion volume and the volume of irrigation water applied, and (b) uniform application of water. 2. When chemigation is used, include backflow preventers for wells; minimize the harmful amounts of chemigated waters that discharge from the edge of the field, and control deep percolation. In cases where chemigation is performed with furrow irrigation systems, a tail water management system may be needed. <u>The following limitations and special conditions apply:</u> 3. In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. In these special cases, on-site reuse could be precluded and would not be considered part of the management measure for such locations. 4. By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or human health may be adversely affected and where other management measures (nutrients and pesticides) do not reduce concentrations in the discharge, increasing water use efficiency would not be considered			

part of the management measure. 5. In some irrigation districts, the time interval between the order for and the delivery of irrigation water to the farm may limit the irrigator's ability to achieve the maximum on-farm application efficiencies that are otherwise possible. 6. In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone. 7. Where leakage from delivery systems or return flows supports wetlands or wildlife refuges, it may be preferable to modify the system to achieve a high level of efficiency and then divert the "saved water" to the wetland or wildlife refuge. This will improve the quality of water delivered to wetlands or wildlife refuges by preventing the introduction of pollutants from irrigated lands to such diverted water. 8. In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should remain on-site.			
CHAPTER 2: <u>FORESTRY MANAGEMENT MEASURES</u>	**1998 APPROVED**	**APPROVAL DATE**	**YET TO BE APPROVED**
A. Preharvest Planning Management Measure <u>Perform advance planning for forest harvesting that includes the following elements where appropriate:</u> 1. Identify the area to be harvested including location of waterbodies and sensitive areas such as wetlands, threatened or endangered aquatic species habitat areas, or high- erosion-hazard areas (landslide-prone areas) within the harvest unit. 2. Time the activity for the season or moisture conditions when the least impact occurs. 3. Consider potential water quality impacts and erosion and sedimentation control in the selection of silvicultural and regeneration systems, especially for harvesting and site preparation. 4. Reduce the risk of occurrence of landslides and severe erosion by identifying high-erosion-hazard areas and avoiding harvesting in such areas to the extent practicable. 5. Consider additional contributions from harvesting or roads to any known existing water quality impairments or problems in watersheds of concern. <u>Perform advance planning for forest road systems that includes the following elements where appropriate:</u> 6. Locate and design road systems to minimize, to the extent practicable, potential sediment generation and delivery to surface waters. Key components are: a. locate roads, landings, and skid trails to avoid to the extent practicable steep grades and steep hill slope areas, and to decrease the number of stream crossings;			

b. avoid to the extent practicable locating new roads and landings in Streamside Management Areas (SMAs); and c. determine road usage and select the appropriate road standard. 7. Locate and design temporary and permanent stream crossings to prevent failure and control impacts from the road system. Key components are: a. size and site crossing structures to prevent failure; b. for fish-bearing streams, design crossings to facilitate fish passage. 8. Ensure that the design of road prism and the road surface drainage are appropriate to the terrain and that road surface design is consistent with the road drainage structures. 9. Use suitable materials to surface roads planned for all-weather use to support truck traffic. 10. Design road systems to avoid high erosion or landslide hazard areas. Identify these areas and consult a qualified specialist for design of any roads that must be constructed through these areas. 11. Each State should develop a process (or utilize an existing process) that ensures that the management measures in this chapter are implemented. Such a process should include appropriate notification, compliance audits, or other mechanisms for forestry activities with the potential for significant adverse nonpoint source effects based on the type and size of operation and the presence of stream crossings or SMAs.			
B. Streamside Management Areas (SMAs) 1. Establish and maintain a streamside management area along surface waters, which is sufficiently wide and which includes a sufficient number of canopy species to buffer against detrimental changes in the temperature regime of the waterbody, to provide bank stability, and to withstand wind damage. 2. Manage the SMA in such a way as to protect against soil disturbance in the SMA and delivery to the stream of sediments and nutrients generated by forestry activities, including harvesting. 3. Manage the SMA canopy species to provide a sustainable source of large woody debris needed for instream channel structure and aquatic species habitat.			
C. Road Construction/Reconstruction Management Measure 1. Follow preharvest planning (as described under Management) when constructing or reconstructing the roadway. 2. Follow designs planned under Management Measure A for road surfacing and shaping.			

3. Install road drainage structures according to designs planned under Management Measure A and regional storm return period and installation specifications. Match these drainage structures with terrain features and with road surface and prism designs. 4. Guard against the production of sediment when installing stream crossings. 5. Protect surface waters from slash and debris material from roadway clearing. 6. Use straw bales, silt fences, mulching, or other favorable practices on disturbed soils on unstable cuts, fills, etc. 7. Avoid constructing new roads in SMAs to the extent practicable.			
D. Road Management 1. Avoid using roads where possible for timber hauling or heavy traffic during wet or thaw periods on roads not designed and constructed for these conditions. 2. Evaluate the future need for a road and close roads that will not be needed. Leave closed roads and drainage channels in a stable condition to withstand storms. 3. Remove drainage crossings and culverts if there is a reasonable risk of plugging or failure from lack of maintenance. 4. Following completion of harvesting, close and stabilize temporary spur roads and seasonal roads to control and direct water away from the roadway. Remove all temporary stream crossings. 5. Inspect roads to determine the need for structural maintenance. Conduct maintenance practices, when conditions warrant, including cleaning and replacement of deteriorated structures and erosion controls, grading or seeding of road surfaces, and, in extreme cases, slope stabilization or removal of road fills where necessary to maintain structural integrity. 6. Conduct maintenance activities, such as dust abatement, so that chemical contaminants or pollutants are not introduced into surface waters to the extent practicable. 7. Properly maintain permanent stream crossings and associated fills and approaches to reduce the likelihood (a) that stream overflow will divert onto roads, and (b) that fill erosion will occur if the drainage structures become obstructed.			
E. Timber Harvesting The timber harvesting management measure consists of implementing the following: 1. Timber harvesting operations with skid trails or cable yarding follow layouts determined under Management Measure A. 2. Install landing drainage structures to avoid sedimentation to the extent practicable. Disperse landing drainage over side slopes. 3. Construct landings away from steep slopes and reduce the likelihood of fill slope failures. Protect			

landing surfaces used during wet periods. Locate landings outside of SMAs. 4. Protect stream channels and significant ephemeral drainages from logging debris and slash material. 5. Use appropriate areas for petroleum storage, draining, dispensing. Establish procedures to contain and treat spills. Recycle or properly dispose of all waste materials. For cable yarding: 6. Limit yarding corridor gouge or soil plowing by properly locating cable-yarding landings. 7. Locate corridors for SMAs following Management Measure B. For ground skidding: 8. Within SMAs, operate ground skidding equipment only at stream crossings to the extent practicable. In SMAs, fell and end line trees to avoid sedimentation. 9. Use improved stream crossings for skid trails, which cross-flowing drainages. Construct skid trails to disperse runoff and with adequate drainage structures. 10. On steep slopes, use cable systems rather than ground skidding where ground skidding may cause excessive sedimentation.			
F. Site Preparation and Forest Management Measure Confine on-site potential NPS pollution and erosion resulting from site preparation and the regeneration of forest stands. The components of the management measure for site preparation and regeneration are: 1. Select a method of site preparation and regeneration suitable for the site conditions. 2. Conduct mechanical tree planting and ground-disturbing site preparation activities on the contour of sloping terrain. 3. Do not conduct mechanical site preparation and mechanical tree planting in streamside management areas. 4. Protect surface waters from logging debris and slash material. 5. Suspend operations during wet periods if equipment used begins to cause excessive soil disturbance that will increase erosion. 6. Locate windrows at a safe distance from drainages and SMAs to control movement of the material during high runoff conditions. 7. Conduct bedding operations in high-water-table areas during dry periods of the year. Conduct bedding in sloping areas on the contour. 8. Protect small ephemeral drainages when conducting mechanical tree plag.			
G. Fire Management			

Prescribe fire for site preparation and control or suppress wildfire in a manner, which reduces potential nonpoint source pollution of surface waters: 1. Intense prescribed fire should not cause excessive sedimentation due to the combined effect of removal of canopy species and the loss of soil-binding ability of sub canopy and herbaceous vegetation roots, especially in SMAs, in streamside vegetation for small ephemeral drainages, or on very steep slopes. 2. Prescriptions for prescribed fire should protect against excessive erosion or sedimentation to the extent practicable. 3. All bladed fire lines, for prescribed fire and wildfire, should be plowed on contour or stabilized with water bars and/or other appropriate techniques if needed to control excessive sedimentation or erosion of the fire line. 4. Wildfire suppression and rehabilitation should consider possible NPS pollution of watercourses, while recognizing the safety and operational priorities of fighting wildfires.			
H. Revegetation of Disturbed Areas Reduce erosion and sedimentation by rapid revegetation of areas disturbed by harvesting operations or road construction: 1. Revegetate disturbed areas (using seeding or planting) promptly after completion of the earth-disturbing activity. Local growing conditions will dictate the timing for establishment of vegetative cover. 2. Use mixes of species and treatments developed and tailored for successful vegetation establishment for the region or area. 3. Concentrate revegetation efforts initially on priority areas such as disturbed areas in SMAs or the steepest areas of disturbance near drainages.			
I. Forest Chemical Management Use chemicals when necessary for forest management in accordance with the following to reduce nonpoint source pollution impacts due to the movement of forest chemicals off-site during and after application: 1. Conduct applications by skilled and, where required, licensed applicators according to the registered use, with special consideration given to impacts to nearby surface waters. 2. Carefully prescribe the type and amount of pesticides appropriate for the insect, fungus, or herbaceous species. 3. Prior to applications of pesticides and fertilizers, inspect the mixing and loading process and the calibration of equipment, and identify the appropriate weather conditions, the spray area, and buffer areas for surface waters. 4. Establish and identify buffer areas for surface waters. (This is especially important for aerial applications.)			

5. Immediately report accidental spills of pesticides or fertilizers into surface waters to the appropriate State agency. Develop an effective spill contingency plan to contain spills.			
J. Wetlands Forest Management Plan, operate, and manage normal, ongoing forestry activities (including harvesting, road design and construction, site preparation and regeneration, and chemical management) to adequately protect the aquatic functions of forested wetlands. **a. Road Design and Construction Practices** 1. Locate and construct forest roads according to preharvest planning. 2. Utilize temporary roads in forested wetlands. 3. Construct fill roads only when absolutely necessary for access since fill roads have the potential to restrict natural flow patterns. 4. Provide adequate cross drainage to maintain the natural surface and subsurface flow of the wetland. 5. Construct roads at natural ground level to minimize the potential to restrict flowing water.			
J. Wetlands Forest Management (Cont.) **b. Harvesting Practices** 1. Conduct forest harvesting according to preharvest planning designs and locations. 2. Planning and close supervision of harvesting operations are needed to protect site integrity and enhance regeneration. Harvesting without regard to season, soil type, or type of equipment can damage the site productivity; retard regeneration; cause excessive rutting, churning, and puddling of saturated soils; and increase erosion and siltation of streams. 3. Establish a streamside management area adjacent to natural perennial streams, lakes, ponds, and other standing water in the forested wetland following the components of the SMA management measure. 4. Ensure that planned harvest activities or chemical use do not contribute to problems of cumulative effects in watersheds of concern. 5. Select the harvesting method to minimize soil disturbance and hydrologic impacts to the wetland. 6. In seasonally flooded wetlands, a guideline is to use conventional skidder logging that employs equipment with low-ground-pressure tires, cable logging, or aerial logging (Doolittle, 1990). 7. When ground skidding, use low-ground-pressure tires or tracked machines and concentrate skidding to a few primary skid trails to minimize site disturbance, soil compaction, and rutting. 8. When soils become saturated, suspend ground skidding harvesting operations. Use of ground			

skidding equipment during excessively wet periods may result in unnecessary site disturbance and equipment damage.			
J. Wetlands Forest Management (Cont.) **c. Site Preparation and Regeneration Practices** 1. Select a regeneration method that meets the site characteristics and management objectives. 2. Conduct mechanized site preparation and planting sloping areas on the contour. 3. To reduce disturbance, conduct bedding operations in high-water-table areas during dry periods of the year. 4. The degree of acceptable site preparation depends on the amount and frequency of flooding, the soil type, and the species suitability. 5. Minimize soil degradation by limiting operations on saturated soils.			
J. Wetlands Forest Management (Cont.) **d. Chemical Management Practices** 1. Apply herbicides by injection or application in pellet form to individual stems. 2. For chemical and aerial fertilizer applications, maintain and mark a buffer area of at least 50 feet around all surface water to avoid drift or accidental direct application. 3. Avoid application of pesticides with high toxicity to aquatic life, especially aerial applications. 4. Apply slow-release fertilizers, when possible. 5. This practice will reduce the potential of the nutrients leaching to ground water, and it will increase the availability of nutrients for plant uptake. 6. Apply fertilizers during maximum plant uptake periods to minimize leaching. 7. Base fertilizer type and application rate on soil and/or foliar analysis. 8. To determine fertilizer formulations, it is best to compare available nitrogen, phosphorus, potassium, and sulphur in the soils to be treated with the requirements of the species to be sown.			
CHAPTER 3: <u>MANAGEMENT MEASURES FOR URBAN AREAS</u>			
Urban Runoff			
A. New Development Management Measure			

By design or performance: 1. After construction has been completed and the site is permanently stabilized, reduce the average annual total suspended solid (TSS) loadings by 80 percent. For the purposes of this measure, an 80 percent TSS reduction is to be determined on an average annual basis, or 2. Reduce the post development loadings of TSS so that the average annual TSS loadings are no greater than predevelopment loadings, and 3. To the extent practicable, maintain post development peak runoff rate and average volume at levels that are similar to predevelopment levels. 4. Develop training and education programs and materials for public officials, contractors, and others involved with the design, installation, operation, inspection, and maintenance of urban runoff facilities.			
B. Watershed Protection Management Measure Develop a watershed protection program to: 1. Avoid conversion, to the extent practicable, of areas that are particularly susceptible to erosion and sediment loss; 2. Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota; and 3. Site development, including roads, highways, and bridges, to protect to the extent practicable the natural integrity of waterbodies and natural drainage systems.			
C. Site Development Management Measure Plan, design, and develop sites to: 1. Protect areas that provide important water quality benefits and/or are particularly susceptible to erosion and sediment loss; 2. Limit increases of impervious areas, except where necessary; 3. Limit land disturbance activities such as clearing and grading, and cut and fill to reduce erosion and sediment loss; and 4. Limit disturbance of natural drainage features and vegetation.			
Construction Site Management Measure - Construction Activities			
A. Construction Site Erosion and Sediment Control Management Measure 1. Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and 2. Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or			

similar administrative document that contains erosion and sediment control provisions.			
B. Construction Site Chemical Control 1. Limit application, generation, and migration of toxic substances; 2. Ensure the proper storage and disposal of toxic materials; and 3. Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.			
Existing Development			
A. Existing Development Management <u>Develop and implement watershed management programs to reduce runoff pollutant concentrations and volumes from existing development:</u> 1. Identify priority local and/or regional watershed pollutant reduction opportunities, e.g., improvements to existing urban runoff control structures; 2. Contain a schedule for implementing appropriate controls; 3. Limit destruction of natural conveyance systems; and 4. Where appropriate, preserve, enhance, or establish buffers along surface waterbodies and their tributaries.			
B. New Onsite Disposal Systems Management Measures 1. Ensure that new Onsite Disposal Systems (OSDS) are located, designed, installed, operated, inspected, and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives: (a) discourage the installation of garbage disposals to reduce hydraulic and nutrient loadings; and (b) where low-volume plumbing fixtures have not been installed in new developments or redevelopments, reduce total hydraulic loadings to the OSDS by 25 percent. Implement OSDS inspection schedules for preconstruction, construction, and post construction. 2. Direct placement of OSDS away from unsuitable areas. Where OSDS placement in unsuitable areas is not practicable, ensure that the OSDS is designed or sited at a density so as not to adversely affect surface waters or ground water that is closely hydrologically connected to surface water. Unsuitable areas include, but are not limited to, areas with poorly or excessively drained soils; areas with shallow water tables or areas with high seasonal water tables; areas overlaying fractured bedrock that drain directly to ground water; areas within floodplains; or areas where nutrient and/or pathogen concentrations in the effluent cannot be sufficiently treated or reduced before the effluent reaches sensitive waterbodies;			

3. Establish protective setbacks from surface waters, wetlands, and floodplains for conventional as well as alternative OSDS. The lateral setbacks should be based on soil type, slope, hydrologic factors, and type of OSDS. Where uniform protective setbacks cannot be achieved, site development with OSDS so as not to adversely affect waterbodies and/or contribute to a public health nuisance; 4. Establish protective separation distances between OSDS system components and groundwater, which is closely hydrologically connected to surface waters. The separation distances should be based on soil type, distance to ground water, hydrologic factors, and type of OSDS; 5. Where conditions indicate that nitrogen-limited surface waters may be adversely affected by excess nitrogen loadings from ground water, require the installation of OSDS that reduce total nitrogen loadings by 50 percent to ground water that is closely hydrologically connected to surface water.			
C. Operating Onsite Disposal Systems Management 1. Establish and implement policies and systems to ensure that existing OSDS are operated and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives, encourage the reduced use of garbage disposals, encourage the use of low-volume plumbing fixtures, and reduce total phosphorus loadings to the OSDS by 15 percent (if the use of low-level phosphate detergents has not been required or widely adopted by OSDS users). Establish and implement policies that require an OSDS to be repaired, replaced, or modified where the OSDS fails, or threatens or impairs surface waters; 2. Inspect OSDS at a frequency adequate to ascertain whether OSDS are failing; 3. Consider replacing or upgrading OSDS to treat influent so that total nitrogen loadings in the effluent are reduced by 50 percent. This provision applies only: a. where conditions indicate that nitrogen-limited surface waters may be adversely affected by significant ground water nitrogen loadings from OSDS, and b. where nitrogen loadings from OSDS are delivered to ground water that is closely hydrologically connected to surface water.			
Pollution Prevention			
A. Pollution Prevention Management Measure <u>Implement pollution prevention and education programs to reduce nonpoint source pollutants generated from the following activities, where applicable:</u> 1. The improper storage, use, and disposal of household hazardous chemicals, including automobile fluids, pesticides, paints, solvents, etc.; 2. Lawn and garden activities, including the application and disposal of lawn and garden care products, and the improper disposal of leaves and yard trimmings;			

3. Turf management on golf courses, parks, and recreational areas; 4. Improper operation and maintenance of onsite disposal systems; 5. Discharge of pollutants into storm drains including floatables, waste oil, and litter; 6. Commercial activities including parking lots, gas stations, and other entities not under NPDES purview; and 7. Improper disposal of pet excrement.			
CHAPTER 4: <u>MANAGEMENT MEASURE FOR ROADS, HIGHWAYS, AND BRIDGES</u>			
A. Management Measure for Planning, Siting, and Developing Roads and Highways <u>Plan, site, and develop roads and highways to:</u> 1. Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss; 2. Limit land disturbance such as clearing and grading and cut and fill to reduce erosion and sediment loss; and 3. Limit disturbance of natural drainage features and vegetation.			
B. Management Measure for Bridges 1. Site, design, and maintain bridge structures so that sensitive and valuable aquatic ecosystems and areas providing important water quality benefits are protected from adverse effects.			
C. Management Measure for Construction Projects 1. Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction and 2. Prior to land disturbance, prepare and implement an approved erosion control plan or similar administrative document that contains erosion and sediment control provisions.			
D. Management Measure for Construction Site Chemical Control 1. Limit the application, generation, and migration of toxic substances; 2. Ensure the proper storage and disposal of toxic materials; and 3. Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface water.			

E. Management Measure for Operation and Maintenance 1. Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.			
F. Management Measure for Road, Highway, and Bridge Runoff Systems Develop and implement runoff management systems for existing roads, highways, and bridges to reduce runoff pollutant concentrations and volumes entering surface waters. 1. Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures; and 2. Establish schedules for implementing appropriate controls.			
CHAPTER 5: MANAGEMENT MEASURE FOR MARINAS & RECREATIONAL BOATING			
Siting and Design			
A. Marina Flushing Management Measure 1. Site and design new marinas such that the bottom of the marina and the entrance channel are not deeper than adjacent navigable water unless it can be demonstrated that the bottom will support a natural population of benthic organisms.			
B. Water Quality Assessment Management Measure 1. **Assess water quality as part of marina siting and design.**			
C. Habitat Assessment Management Measure 1. Site and design marinas to protect against adverse effects on shellfish resources, wetlands, submerged aquatic vegetation, or other important riparian and aquatic habitat areas as designated by local, State, or Federal governments.			
D. Shoreline Stabilization Management Measure 1. Where shoreline erosion is a nonpoint source pollution problem, shorelines should be stabilized. Vegetative methods are strongly preferred unless structural methods are more cost effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse impact on other shorelines and offshore areas.			

E. Storm Water Runoff Management Measure 1. Implement effective runoff control strategies, which include the use of pollution prevention activities and the proper design of hull maintenance areas. Reduce the average annual loadings of total suspended solids (TSS) in runoff from hull maintenance areas by 80 percent. For the purposes of this measure, an 80 percent reduction of TSS is to be determined on an average annual basis.			
F. Fueling Station Design Management Measure 1. Design fueling stations to allow for ease in cleanup of spills.			
G. Sewage Facility Management Measure 1. Install pump out, dump station, and restroom facilities where needed at new and expanding marinas to reduce the release of sewage to surface waters. Design these facilities to allow ease of access and post signage to promote use by the boating public.			
Solid Waste Management Measure - III. Marina and Boat Operation and Maintenance			
A. Solid Waste Management Measure 1. Properly dispose of solid wastes produced by the operation, cleaning, maintenance, and repair of boats to limit entry of solid wastes to surface waters.			
B. Fish Waste Management Measure 1. Promote sound fish waste management through a combination of fish-cleaning restrictions, public education, and proper disposal of fish waste.			
C. Liquid Material Management Measure 1. Provide and maintain appropriate storage, transfer, containment, and disposal facilities for liquid material, such as oil, harmful solvents, antifreeze, and paints, and encourage recycling of these materials.			
D. Petroleum Control Management Measure 1. Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.			

E. Boat Cleaning Management Measure 1. For boats that are in the water, perform cleaning operations to minimize, to the extent practicable, the release to surface waters of (a) harmful cleaners and solvents and (b) paint from in-water hull cleaning.			
F. Public Education Management Measure 1. Public education/outreach/training programs should be instituted for boaters, as well as marina owners and operators, to prevent improper disposal of polluting material.			
G. Maintenance of Sewage Facilities Management Measure 1. Ensure that sewage pump out facilities are maintained in operational condition and encourage their use.			
H. Boat Operation Management Measure (applies to boating only) 1. Restrict boating activities where necessary to decrease turbidity and physical destruction of shallow-water habitat.			
CHAPTER 6: MANAGEMENT MEASURES FOR HYDROMODIFICATION: CHANNELIZATION AND CHANNEL MODIFICATION, DAMS, AND STREAMBANK AND SHORELINE EROSION			
Management Measure for Physical and Chemical Characteristics of Surface Waters - II. **Channelization and Channel Modification Management Measures**			
A. Management Measure for Physical and Chemical Characteristics of Surface Waters 1. Evaluate the potential effects of proposed channelization and channel modification on the physical and chemical characteristics of surface waters in coastal areas; 2. Plan and design channelization and channel modification to reduce undesirable impacts; and 3. Develop an operation and maintenance program for existing modified channels that includes identification and implementation of opportunities to improve physical and chemical characteristics of surface waters in those channels.			
B. Instream and Riparian Habitat Restoration Management Measure 1. Evaluate the potential effects of proposed channelization and channel modification on instream and riparian habitat in coastal areas;			

2. Plan and design channelization and channel modification to reduce undesirable impacts; and 3. Develop an operation and maintenance program with specific timetables for existing modified channels that includes identification of opportunities to restore instream and riparian habitat in those channels.			
Management Measure for Erosion and Sediment Control - III. Dams Management Measures			
A. Management Measure for Erosion and Sediment Control 1. Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and 2. Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.			
B. Management Measure for Chemical and Pollutant Control 1. Limit application, generation, and migration of toxic substances; 2. Ensure the proper storage and disposal of toxic materials; and, 3. Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.			
C. Management Measure for Protection of Surface Water Quality and Instream and Riparian Habitat Develop and implement a program to manage the operation of dams in coastal areas that includes an assessment of: 1. Surface water quality and instream and riparian habitat and potential for improvement and 2. Significant nonpoint source pollution problems that result from excessive surface water withdrawals.			
IV. Streambank and Shoreline Erosion Management Measure			
A. Management Measure for Eroding Streambanks and Shorelines 1. Where streambank or shoreline erosion is a nonpoint source pollution problem, streambanks and shorelines should be stabilized. Vegetative methods are strongly preferred unless structural methods are more cost-effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse impact on other streambanks, shorelines, and offshore areas. 2. Protect streambank and shoreline features with the potential to reduce NPS pollution. 3. Protect streambanks and shorelines from erosion due to uses of either the shore lands or adjacent surface waters.			

CHAPTER 7: MANAGEMENT MEASURES FOR WETLANDS, RIPARIAN AREAS, AND VEGETATED TREATMENT SYSTEMS			